

Bauer (Louis)

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CRITICAL EXAMINATION

OF A

PATHOLOGICAL SPECIMEN

OF

SOFTENING

OF THE

Intervertebral Fibro-Cartilages.

(FROM THE NEW YORK JOURNAL OF MEDICINE.)

BY LOUIS BAUER, M.D.,

PHYSICIAN AND SURGEON, BERLIN; MEMBER OF THE ROYAL COLLEGE  
OF SURGEONS, ENGLAND; CORRESPONDING FELLOW OF THE  
MEDICAL SOCIETY OF LONDON; FELLOW OF PATHOLOGICAL  
SOCIETY OF NEW YORK; LATE SURGEON OF THE ROYAL  
ORTHOPEDIC INSTITUTION OF MANCHESTER, GREAT  
BRITAIN, ETC., ETC., ETC.



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DR. LEWIS A. SAYRE, Surgeon to Bellevue Hospital, exhibited to the Pathological Society of New York, on the 8th inst., a specimen of more than ordinary interest. It represents the lower half of the spine and sacrum of a youth, 21 years of age, who suffered for about 18 months with caries of that organ, attended with consecutive destruction of the lumbar vertebræ, and who died with symptoms of retention of urea in the blood.

The history of the case does not furnish any reliable evidence as to the origin of the disease, nor has the post-mortem examination of the vital organs elicited any proof to that effect. This, however, does by no means diminish the importance of the specimen, as regards pathology in general, and spinal affections especially.

The specimen embraces the five lower thoracic, all the lumbar vertebræ, and the sacrum. On the outside, right and left, there are large cavities between the psoas and quadratus muscles, connected both with a carious ulcer of the spine and the surface. In its passage, the matter had superficially corroded the left transverse process of the third lumbar vertebræ. The left kidney was somewhat adherent to the spine by rigid and short fibrous bands; traces of fatty degeneration were also perceptible in that organ.

The spine itself, anteriorly and longitudinally divided, presented in its fresh state the following appearances: no engorgement of blood; no tubercular deposits; no ordinary signs of inflammation, nor any trace of inflammatory products: the fibro-cartilages were very much softened, being almost gelatinous, out of which oily and adhesive liquid could be squeezed; the color of both the cartilages and the infiltrated liquid was of a whitish tint. The elasticity of the cartilages had entirely disappeared; they were apparently of different consistence; nearer to the carious ulcer, appearing to be softer than the more distant. Between the second and third lumbar vertebræ they were carious, disintegrated, more superficial on the inferior surface of the second, but more sub-

stantial on the superior surface of the third. In the centre of the third lumbar vertebral body, there was a small and movable sequestrum, and outside of that bone the commencement of an osteophyte became observable. The corresponding intervertebral cartilage was almost entirely destroyed, the anterior laminae only being left; but those vertebral bodies had not approximated, being kept separated by the articular process. On the inferior surface of the eleventh thoracic vertebra, about its centre, there was a small carious excavation surrounded by dense osseous tissue (eburnated, Jones Tomes), and filled with an elongation of cartilage. Finally, it deserves to be mentioned, that the spine was almost straightened, the normal curves having nearly disappeared. This latter condition of the spine was by no means the effect of death, being found also in the cast, taken in plaster from the living patient by myself.

The microscopical examination, kindly aided by Prof. Alonzo Clark, presented the unmistakable marks of textural disintegration and fatty degeneration of the intervertebral cartilages in different degrees of advancement, from the breaking up of the fibrous texture down to nucleated, elongated cells, corpuscles and fat globules; but there was no evidence of tubercular matter.

The nature of the case, and the peculiar pathological conditions of this specimen, give rise to most important considerations.

In the first place, it is of the utmost importance to determine whether the disease originated in the vertebral bodies, extending subsequently to the intervertebral cartilages, or *vice versa*. In examining this specimen, it strikes one forcibly that the carious destruction is not only of limited extent, and comparatively superficial, but is also confined to three vertebrae. Moreover, the caries, at the inferior surface of the eleventh thoracic vertebra, is in its incipient stage, presenting in its immediate vicinity eburnated osseous structure, which has been recognized by Jones Tomes as characteristic of the earliest phase of caries. The excavation is but trifling, and would scarcely receive a small-sized pea.

The remaining seven vertebrae were, to all appearance, in normal condition. But the intervertebral cartilage between the second and third lumbar vertebrae is almost consumed, the anterior portion only being left. And the other intervertebral cartilages (notwithstanding that their corresponding vertebral bodies are in perfect integrity), are disintegrated and degenerated to a greater or less degree, obvious to the naked eye, as well as to microscopical inspection. Had the bones



been primarily affected, the disease of the cartilages would have been confined to the neighborhood of the carious affection, and the degree of disorganization of the former would bear comparison with the extent of caries.

According to Mr. Toynbee's researches (*Philosoph. Transac.*, 1841), the intervertebral cartilages are far less liable to spontaneous decomposition, absorption, and disintegration than the vertebræ; hence, it is not uncommon to find the intervertebral disks entire when the adjacent bodies of the vertebræ have been destroyed by disease. The specimen, however, exhibits the direct reverse. Again, it cannot be argued that caries of the lumbar vertebræ could become the proximate cause of degeneration of remote cartilages. Thus it is evident, that the latter have been primarily diseased, and that the vertebral bodies have been involved consecutively.

The next point of consideration is, as to the nature of the disease of the intervertebral cartilages in the present case. All that can be made out, in reference to the fibro-cartilages of the spine, is change of color, consistency, and organization, from the higher to the lower order, increase of saturation with serum, and the formation of fat globules.

There are no signs of ordinary inflammation either in the intervertebral disks or the adjacent parts. It is also doubtful whether the local pains which the patient suffered were consequent upon the original disease or its ultimate effects, especially the formation of consecutive abscess.

Authors of note assert that cartilaginous tissue is not liable to inflammation, on account of not possessing blood-vessels and nerves. Later and more minute anatomical investigations have, however, shown that at least fibro-cartilages receive some minor blood-vessels, though they do not ramify in its fibrous parenchyma. But some modern writers entertain the idea that inflammation is but a perverted nutritive process, excited by morbid irritation. According to Redfern, Goodsir, Gurlt, Carpenter, Paget, Virchow, and others, cartilaginous structure is just as liable to inflammation as any other, provided that the formative action is carried on by some means, though the signs of inflammation and the subsequent structural changes are necessarily influenced by those peculiarities which the nutritive process in such structure presents. Thus we find, in conformity with the observations of Redfern, Goodsir, and Gurlt, the inflammatory changes confined to the cartilaginous fibres and cells—the former broken down, partly dissolved and separated; the latter enlarged, deformed, the nuclei degenerated

into corpuscles, and the hyaline substance infiltrated with serous fluid. In comparing these statements of the before-mentioned authors with the pathological peculiarities of the specimen under consideration, I am inclined to believe that a *low grade of inflammation* has been the nature of the disease. But, however opinions may differ on this point, it will be unreservedly admitted, that the character of that malady is debility, is minus of action, resulting in structural disintegration. And this is decidedly of great practical weight in reference to the treatment in analogous cases.

A third point worthy of discussion is the straight form of the spine. A straight vertebral column, at the age of twenty-one years, must be considered a deformity, for there should be two curves, respectively, in the thoracic and lumbar portions. This deformity is undoubtedly attributable to the entire loss of elasticity in the intervertebral cartilages, and at the same time to the recumbent posture the patient had adopted during the last fifteen months of his illness. In that position, the spine had but to yield to the weight of those organs which pressed upon it anteriorly, and to adapt itself to the mattress. To this circumstance may be attributed the absence of approximation between the second and third lumbar vertebræ, which would have been unavoidable in the erect posture. The fact that (according to the above statement) the spinal column had assumed a straight form, is a sufficient proof that the opposite deformity would have been acquired by the patient in the upright position. At this point I am naturally led to compare the views of Nélaton with the fact before the reader. This distinguished French surgeon states that posterior curvature and Pott's disease are invariably the effect of tubercular deposits in the cancellated tissue of the vertebral bodies. Now this specimen is at least one of those exceptions which I occasionally meet with. Posterior curvature of the superior thoracic portion of the spine not unfrequently occurs in apparently healthy, and even blooming children, at the age of three to six years, where no scrofulous or tubercular affection can be detected. There are no symptoms of inflammation; the pain is principally peripheral either in the epigastric regions or in the lower extremities; the latter become occasionally paralyzed, owing to pressure upon the intervertebral nerves. The patients may become emaciated and assume the appearance of old people. The spine is unusually flexible, though not commonly in the distorted portion, being kept stiff and immovable by dorsal muscles. Left to themselves, those cases often recover, retaining, of course, a deformity of greater or less



extent; the spines consolidate, and the patients may attain a considerable age, affected usually with asthma. But if a patient is kept for some length of time in a horizontal position, in the enjoyment of good air and food, the progress of that deformity will be arrested, and being suspended in an appropriate apparatus, head and legs being used as weights, the deformity will even diminish and the general health improve remarkably. Such cases I have had in my Institution, and the results of that treatment proved highly satisfactory.

I do not conceive the possibility of bringing cases of this description in any relation to tuberculous deposits. Miliary tubercles, as long as they remain latent, will not interfere with the shape of the vertebræ, and can therefore not come under consideration as causes of spinal deformity. But if the tubercular deposits augment, gradually soften, and subsequently involve the surrounding cancellated tissue, inflammation and caries will ensue, constituting at once a malady that does not come under the series of posterior spinal deformities which I have in view. Nor can it be comprehended, why a horizontal posture and horizontal suspension of the patient could arrest the progress of the disease, and diminish even its material extent, if tubercles had misshaped the vertebral bodies. For this reason, I believe that cases of this description have nothing to do with tuberculous disease, and must be considered as the simple effect of softening of the intervertebral cartilages, associated with loss of their elastic properties. These views I have entertained for a long time, but I have never before had the opportunity to corroborate them by post-mortem examination.

I consider, therefore, this specimen as one of the greatest pathological importance; for it confirms the occurrence of idiopathic disease of the intervertebral cartilages, and establishes the fact that the mere loss of elasticity becomes the source of deformity, and also that even caries may result from such pathological conditions. According to such facts, Nélaton's opinion requires its limitation. In fine, it can also be said that the much-applied local derivation can hardly give any hope of success, but must render the debilitated state still worse.

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